CLAIMS:

1. A rotary machine comprising:

a housing with an internal wall defining a working volume;

a rotor mounted for rotational movement within the working volume, said rotor having first and second curved faces meeting at apices;

means for rotating said rotor within said housing;

said housing defining first and second spaced apart generally side by side vane locations communicating with said working volume;

first and second vanes having a rotor-contacting end, disposed in each said vane location;

said rotor movable within the working volume to a top position so as to contact said internal wall to divide said working volume into a first minimum size working volume and a second much larger size working volume;

said vane locations communicating with said minimum size working volume so that the rotor-contacting ends of said vanes contact spaced apart portions of said first rotor curved face;

said first and said second vanes comprising a first full time reciprocating seal with a first portion of said first rotor curved face and a second reciprocating valving seal with a second portion of said first rotor curved face;

said first vane reciprocably movable in said first vane location for movement of its rotor-contacting end to maintain substantially continuous seal forming contact with said first rotor curved face as said rotor moves in said housing;

said second vane reciprocably movable in said second vane location for movement of its rotor-contacting end toward and away from said first rotor curved face to form a selectable valving seal contact with said first rotor curved face; and

so as to form a selectably openable additional working volume between the rotor-contacting ends of said vanes, said first rotor curved face and said internal wall.

2. The rotary machine of claim 1 further comprising intake and outlet ports in communication with said working volume, cooperating to provide a positive displacement pumping action as said rotor is moved within said housing.

3. The rotary machine of claim 1 further comprising intake and outlet ports in communication with said working volume, cooperating to provide expansion of a high pressure fluid inputted to said intake port as said rotor is moved within said housing.

4. The rotary machine of claim 1 further comprising intake and outlet ports in communication with said working volume, with said outlet port located between said first and said second vanes.

5. The rotary machine of claim 1 wherein said internal wall defines a cartiodal shape having a cartiodal projection region between said first and said second vanes.

6. The rotary machine of claim 5 further comprising a reference line extending into said working volume, dividing said cartiodal projection region and said rotor into respective generally equal sized portions.

7. The rotary machine of claim 1 wherein said first vane location is upstream of said second vane location, with respect to rotational movement of said rotor.

8. The rotary machine of claim 7 wherein multiple vanes are located in said first vane location.

9. The rotary machine of claim 7 wherein three vanes are located in said first vane location.

10. The rotary machine of claim 9 wherein said first vane location comprises a slot, with said three vanes serially disposed in said slot in a single file arrangement.

11. The rotary machine of claim 10 wherein said three vanes comprise a first larger vane disposed between smaller vanes.

12. The rotary machine of claim 1 wherein said rotor has a generally lenticular shape.

13. The rotary machine of claim 1 wherein said rotor is mounted for eccentric movement within said housing.

14. The rotary machine of claim 1 wherein said rotor is mounted for eccentric rotational movement about a fixed axis.

15. A rotary machine comprising:

a housing with an internal wall defining a working volume;

a rotor mounted for rotational movement within the working volume, said rotor having first and second curved faces meeting at apices;

means for rotating said rotor within said housing;

said housing defining first and second spaced apart generally side by side vane locations communicating with said working volume;

first and second vanes having a rotor-contacting end, disposed in each said vane location;

said rotor movable within the working volume to a top position so as to contact said internal wall to divide said working volume into a first minimum size working volume and a second much larger size working volume;

said vane locations communicating with said minimum size working volume so that the rotor-contacting ends of said vanes contact spaced apart portions of said first rotor curved face;

said first and said second vanes comprising full time reciprocating seals with first and second spaced apart portions of said first rotor curved face;

said first and said second vanes reciprocably movable in their respective vane locations for movement of their respective rotor-contacting ends to maintain substantially continuous seal forming contact with spaced apart portions of said first rotor curved face as said rotor moves in said housing; and

so as to form an additional working volume between the rotor-contacting ends of said vanes, said first rotor curved face and said internal wall.

16. The rotary machine of claim 14 further comprising intake and outlet ports in communication with said working volume, cooperating to provide a positive displacement pumping action as said rotor is moved within said housing.

17. The rotary machine of claim 14 further comprising intake and outlet ports in communication with said working volume, cooperating to provide expansion of a high pressure fluid inputted to said intake port as said rotor is moved within said housing.

18. The rotary machine of claim 14 further comprising intake and outlet ports in communication with said working volume, with said outlet port located between said first and said second vanes.

19. The rotary machine of claim 14 wherein said internal wall defines a cartiodal shape having a cartiodal projection region between said first and said second vanes.

20. The rotary machine of claim 18 further comprising a reference line extending into said working volume, dividing said cartiodal projection region and said rotor into respective generally equal sized portions.

21. The rotary machine of claim 14 wherein said first vane location is upstream of said second vane location, with respect to rotational movement of said rotor, and wherein multiple vanes are located in said first vane location.

22. The rotary machine of claim 7 wherein three vanes are serially disposed in said slot in a single file arrangement.

23. The rotary machine of claim 21 wherein said three vanes comprise a first larger vane disposed between smaller vanes.

24. The rotary machine of claim 14 wherein said rotor has a generally lenticular shape.

25. The rotary machine of claim 14 wherein said rotor is mounted for eccentric movement within said housing.

26. The rotary machine of claim 14 wherein said rotor is mounted for eccentric rotational movement about a fixed axis.